

ENGINEERING INDEX PROPERTIES
Williams County, North Dakota

Engineering Index Properties table gives the engineering classifications and the range of index properties for the layers of each soil in the survey area. Depth to the upper and lower boundaries of each layer is indicated. Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. Loam, for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, gravelly. Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 1998) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1998). The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection. If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in Engineering Index Properties table.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. The estimates of particle-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is generally omitted in the table.

ENGINEERING INDEX PROPERTIES--Continued
Williams County, North Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index		
					>10 inches		3-10 inches		4	10	40	200		
			Unified	AASHTO	Pct	Pct								
	In													
53: Arnegard-----	0-13	Loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-95	60-85	20-35	5-20		
	13-36	Loam	CL	A-6	0	0	100	100	85-100	50-85	20-35	12-25		
	36-60	Loam	SC, SM, CL, ML	A-4, A-6	0	0	100	100	70-100	40-80	15-40	NP-15		
92: Badland-----	0-60	Bedrock	CH, CL-ML, SC, SC-SM, CL	A-4, A-6, A-7	0	0	90-100	85-100	75-100	35-95	15-75	5-50		
	0-4	Loamy fine sand	SC-SM, SM, SP-SM	A-2	0	0	100	100	80-100	10-35	15-25	NP-5		
100: Banks-----	4-60	Stratified loamy fine sand to very fine sandy loam	SC-SM, SM	A-2, A-4	0	0	100	100	60-80	25-50	15-25	NP-5		
	0-4	Loamy fine sand	SC-SM, SM, SP-SM	A-2	0	0	100	100	80-100	10-35	15-25	NP-5		
	4-60	Stratified loamy fine sand to very fine sandy loam	SC-SM, SM	A-2, A-4	0	0	100	100	60-80	25-50	15-25	NP-5		
281: Bowdle-----	0-8	Loam	CL, ML	A-4, A-6	0	0	100	95-100	85-95	55-80	30-40	7-15		
	8-16	Loam	CL, ML	A-6, A-4	0	0	95-100	90-100	70-95	50-75	30-40	8-15		
	16-22	Loam	CL, ML	A-4, A-6	0	0	95-100	90-100	70-95	50-75	30-40	8-15		
	22-25	Gravelly loam	CL, ML	A-4, A-6	0	0	90-100	80-100	60-95	30-60	25-35	5-10		
	25-30	Very gravelly loamy sand	SM, SP-SM, SW-SM	A-1, A-2	0-2	0-5	60-95	50-75	30-50	5-30	0-30	NP-5		
	30-60	Very gravelly loamy sand	SM, SP-SM, SW-SM	A-1, A-2	0-2	0-5	40-80	25-60	10-35	2-30	0-30	NP-5		
340: Cabba-----	0-3	Loam	CL, CL-ML, ML	A-4	0	0-5	90-100	85-100	70-90	60-80	20-30	NP-10		
	3-15	Loam	CL, CL-ML	A-4, A-6	0	0-5	95-100	90-100	85-100	80-95	25-35	5-15		
	15-60	Bedrock	CH, CL-ML, SC, SC-SM	A-4, A-6, A-7	---	---	---	---	---	---	---	---		
669: Farland-----	0-60				0	0	90-100	85-100	75-100	35-95	15-75	5-50		
	0-4	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	70-90	20-40	5-20		
	4-18	Silty clay loam	CH, CL	A-7	0	0	100	100	90-100	80-95	40-60	15-35		
	18-34	Silt loam	CL, CL-ML, ML	A-4, A-6, A-7	0	0	100	100	85-100	80-90	25-50	5-20		
674: Farnuf-----	34-60	Stratified very fine sandy loam to silty clay loam	CL, CL-ML, ML	A-4, A-6, A-7	0	0	100	100	75-100	50-95	20-50	3-25		
	0-9	Loam	CL, CL-ML	A-4, A-6	0	0	100	100	90-95	70-80	25-40	5-20		
	9-23	Clay loam	CL	A-6, A-7	0	0	100	100	80-95	55-85	30-50	15-25		
	23-34	Loam	CL	A-6, A-7	0	0	100	100	80-95	70-95	35-50	15-25		
676: Farnuf-----	34-60	Stratified fine sandy loam to silty clay loam	CH, CL, CL-ML	A-4, A-6, A-7	0	0	100	100	75-100	70-100	25-55	5-30		
	0-9	Loam	CL, CL-ML	A-4, A-6	0	0	100	100	90-95	70-80	25-40	5-20		
	9-23	Clay loam	CL	A-6, A-7	0	0	100	100	80-95	55-85	30-50	15-25		
	23-34	Loam	CL	A-6, A-7	0	0	100	100	80-95	70-95	35-50	15-25		
Sakakawea-----	34-60	Stratified fine sandy loam to silty clay loam	CH, CL, CL-ML	A-4, A-6, A-7	0	0	100	100	75-100	70-100	25-55	5-30		
	0-6	Loam	CL, CL-ML, ML	A-4, A-6	0	0	100	95-100	80-95	55-75	25-40	5-20		
	6-21	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	85-100	65-85	20-40	5-25		
	21-41	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	85-100	65-85	20-40	5-25		
882: Hamerly-----	41-60	Stratified loamy sand to silty clay	CL, ML, SC, SM	A-4, A-6, A-2	0	0	100	95-100	50-100	10-85	15-40	NP-25		
	0-8	Loam	CL, CL-ML	A-4, A-6	0	0-5	95-100	90-100	80-95	60-90	20-40	5-20		
	8-35	Loam	CL, CL-ML	A-6, A-7, A-4	0	0-5	95-100	90-100	80-95	60-75	20-45	5-25		
	35-60	Loam	CL, CL-ML	A-4, A-6, A-7	0	0-5	95-100	90-100	75-95	55-75	20-45	5-25		
Tonka-----	0-13	Silt loam	CL, CL-ML	A-4, A-6	0-1	0-2	100	95-100	90-100	70-90	20-35	5-15		
	13-19	Loam	CL, CL-ML	A-4, A-6	0-1	0-2	100	95-100	90-100	70-90	20-35	5-15		
	19-34	Silty clay loam	CH, CL	A-6, A-7	0-1	0-2	100	95-100	90-100	75-95	35-55	15-35		
	34-50	Clay loam	CL, CL-ML	A-4, A-6, A-7	0-1	0-3	90-100	85-100	60-100	50-90	25-50	5-30		
910: Havrelon-----	50-60	Clay loam	CL, CL-ML	A-4, A-6, A-7	0-1	0-3	90-100	85-100	60-100	50-90	25-50	5-30		
	0-13	Loam	ML, CL, CL-ML	A-4, A-6	0	0	100	100	85-100	60-95	20-40	3-20		
	13-60	Stratified very fine sandy loam to silty clay loam	CL, CL-ML, ML	A-7, A-4, A-6	0	0	100	100	85-100	60-80	30-40	3-28		
1021: Korchea-----	0-6	Loam	CL, CL-ML	A-4, A-6	0	0	95-100	95-100	70-100	40-95	20-50	5-15		
	6-60	Stratified fine sandy loam to silty clay loam	SC-SM, CL, CL-ML, SC	A-4, A-6, A-7	0	0	95-100	95-100	70-100	40-95	20-50	5-20		

ENGINEERING INDEX PROPERTIES--Continued
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Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
					>10 inches		3-10 inches		4	10		
			Unified	AASHTO	Pct	Pct						
	In											
1128: Lehr-----	0-6	Loam	CL, CL-ML, ML	A-4, A-6	0	0	95-100	95-100	85-95	60-80	20-40	3-15
	6-11	Loam	SC, SC-SM, CL, CL-ML	A-4, A-6	0-2	0-5	90-100	80-100	75-95	40-75	25-40	5-15
	11-15	Loam	CL, CL-ML,	A-4, A-6	0-2	0-5	90-100	80-100	75-95	40-75	25-40	5-15
	15-22	Gravelly loamy coarse sand	SC, SC-SM SM, SP-SM	A-1	0-2	0-5	65-90	50-75	30-50	5-15	0-14	NP
1143: Lihen-----	22-60	Very gravelly coarse sand	GM, GP, SM, SP	A-1	0-2	0-5	40-80	25-60	10-35	2-15	0-14	NP
	0-9	Loamy fine sand	SM	A-2	0	0	100	100	50-90	15-35	0-20	NP-5
	9-24	Loamy sand	SM	A-2	0	0	100	100	50-90	15-35	0-20	NP-5
	24-32	Sand	SM	A-2	0	0	100	100	50-90	15-35	0-20	NP-5
1178: Lohler-----	32-60	Sand	SM	A-2	0	0	100	100	50-90	15-35	0-20	NP-5
	0-8	Silty clay	CH, CL	A-7	0	0	100	100	95-100	80-95	45-70	25-50
	8-60	Silty clay	CH, CL	A-7	0	0	100	100	95-100	80-95	45-70	25-50
1249: Appam-----	0-6	Sandy loam	SC, SC-SM, SM	A-2, A-4	0	0	85-100	85-100	60-80	30-40	0-25	NP-10
	6-15	Sandy loam	SC, SC-SM, SM	A-2, A-4	0	0	85-100	85-100	60-80	30-40	0-25	NP-10
	15-19	Sandy loam	SC, SC-SM, SM	A-2, A-4	0	0	85-100	85-100	60-80	30-40	0-25	NP-10
	19-60	Gravelly coarse sand	GM, GP, GP- GM, SP-SM	A-1, A-2, A-3	0	0	35-100	25-100	10-60	0-15	0-14	NP
1427: Parnell-----	0-15	Silty clay loam	CH, CL, OL	A-7	0	0-1	100	100	95-100	85-100	40-55	20-35
	15-22	Silt loam	CH, CL, OL	A-7	0	0-1	100	100	95-100	85-100	40-55	20-35
	22-32	Silty clay loam	CH, CL	A-7	0	0-2	100	95-100	90-100	70-100	50-75	30-50
	32-55	Silty clay	CH, CL	A-7	0	0-2	100	95-100	90-100	70-100	50-75	30-50
1466: Pits, Gravel An Sand-----	55-60	Silty clay loam	CH, CL	A-7	0	0-2	95-100	90-100	80-95	70-95	50-60	30-40
	0-6	Extremely gravelly sand	GW-GM, SW-SM	A-1, A-3	0	0-5	25-90	10-65	5-35	0-25	0-15	NP-5
	6-60	Extremely gravelly sand	GW-GM, SW-SM	A-1, A-3	0	0-10	25-90	10-65	5-35	0-25	0-15	NP-5
1664: Shambo-----	0-9	Loam	CL	A-6	0	0	100	100	85-95	60-75	25-35	10-15
	9-13	Loam	CL	A-6	0	0	100	100	85-95	60-75	25-40	10-20
	13-29	Loam	CL	A-6	0	0	100	100	85-95	60-75	25-40	10-20
	29-48	Loam	CL	A-6	0	0	100	100	85-95	60-75	25-40	10-20
1710: Southam-----	48-60	Loam	CL	A-7-6, A-6	0	0	100	100	85-95	60-75	30-45	10-20
	0-16	Silty clay loam	CH, CL, OL	A-7	0	0	100	95-100	90-100	80-100	40-55	20-35
	16-40	Silty clay	CH, CL	A-7	0	0	100	95-100	90-100	85-100	50-65	30-40
	40-60	Silty clay	CH, CL, CL-ML	A-6, A-7	0	0-1	100	95-100	85-100	60-100	35-65	15-40
1798: Tally-----	0-6	Fine sandy loam	CL, ML, SC, SM, CL-ML	A-2, A-4	0	0	90-100	80-100	55-100	25-55	15-30	NP-10
	6-32	Fine sandy loam	SC, SC-SM, SM, CL-ML, ML	A-4, A-2	0	0	90-100	80-100	60-100	25-50	15-25	NP-10
	32-60	Fine sandy loam	SC, SC-SM, SM, CL-ML, ML	A-4, A-2	0	0	90-100	80-100	60-100	15-50	15-25	NP-10
1835: Tonka-----	0-13	Silt loam	CL, CL-ML	A-4, A-6	0-1	0-2	100	95-100	90-100	70-90	20-35	5-15
	13-19	Loam	CL, CL-ML	A-4, A-6	0-1	0-2	100	95-100	90-100	70-90	20-35	5-15
	19-34	Silty clay loam	CH, CL	A-6, A-7	0-1	0-2	100	95-100	90-100	75-95	35-55	15-35
	34-50	Clay loam	CL, CL-ML	A-4, A-6, A-7	0-1	0-3	90-100	85-100	60-100	50-90	25-50	5-30
1854: Trembles-----	50-60	Clay loam	CL, CL-ML	A-7, A-4, A-6	0-1	0-3	90-100	85-100	60-100	50-90	25-50	5-30
	0-9	Fine sandy loam	ML, SM	A-4	0	0	100	100	70-85	40-55	20-30	NP-10
	9-59	Stratified fine sandy loam to silt loam	ML, SM	A-4	0	0	100	100	65-85	35-60	20-30	NP-10
	59-80	Stratified sand to silt loam	SC-SM, SM	A-2, A-4	0	0	100	100	50-70	10-20	0-20	NP
1871: Vallers, Saline	0-9	Loam	CL-ML, ML	A-4	0-1	0-5	95-100	90-100	80-90	50-80	30-40	4-10
	9-44	Clay loam	CL	A-6	0-1	0-5	95-100	90-100	80-95	50-80	30-40	11-20
	44-60	Clay loam	CL, CL-ML	A-4, A-6	0-1	0-5	95-100	90-100	85-95	60-85	20-40	5-20
1978: Water-----	---	---	---	---	---	---	---	---	---	---	---	---

ENGINEERING INDEX PROPERTIES--Continued
Williams County, North Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
					Pct	Pct						
	In											
2014:												
Williams-----	0-6	Loam	CL, ML	A-6, A-7, A-4	0-2	0-5	95-100	95-100	85-95	60-90	25-45	3-20
	6-10	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	10-15	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	15-24	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	24-36	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
Bowbells-----	36-60	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	0-6	Loam	CL	A-4, A-6	0	0-5	95-100	90-100	85-95	60-90	28-37	9-16
	6-14	Clay loam	CL	A-6, A-7	0	0-5	95-100	90-100	80-95	60-80	20-45	10-25
	14-23	Clay loam	CL	A-6, A-7	0	0-5	95-100	90-100	80-95	60-80	20-45	10-25
	23-36	Loam	CL	A-6, A-7	0	0-5	95-100	90-100	80-95	60-80	20-45	10-25
	36-60	Loam	CL	A-6, A-7	0	0-5	95-100	90-100	80-95	60-80	20-45	10-25
2015:												
Williams-----	0-6	Loam	CL, ML	A-4, A-6, A-7	0-2	0-5	95-100	95-100	85-95	60-90	25-45	3-20
	6-10	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	10-15	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	15-24	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	24-36	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
Bowbells-----	36-60	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	0-6	Loam	CL	A-4, A-6	0	0-5	95-100	90-100	85-95	60-90	28-37	9-16
	6-14	Clay loam	CL	A-6, A-7	0	0-5	95-100	90-100	80-95	60-80	20-45	10-25
	14-23	Clay loam	CL	A-6, A-7	0	0-5	95-100	90-100	80-95	60-80	20-45	10-25
	23-36	Loam	CL	A-6, A-7	0	0-5	95-100	90-100	80-95	60-80	20-45	10-25
	36-60	Loam	CL	A-6, A-7	0	0-5	95-100	90-100	80-95	60-80	20-45	10-25
2031:												
Williams-----	0-6	Loam	CL, ML	A-4, A-6, A-7	0-2	0-5	95-100	95-100	85-95	60-90	25-45	3-20
	6-10	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	10-15	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	15-24	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	24-36	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	36-60	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
Zahl-----	0-5	Loam	CL	A-6	0	0-1	95-100	95-100	80-95	55-75	25-40	10-20
	5-20	Loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30
	20-60	Clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30
2032:												
Williams-----	0-6	Loam	CL, ML	A-4, A-6, A-7	0-2	0-5	95-100	95-100	85-95	60-90	25-45	3-20
	6-10	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	10-15	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	15-24	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	24-36	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
Zahl-----	36-60	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	0-5	Loam	CL	A-6	0	0-1	95-100	95-100	80-95	55-75	25-40	10-20
	5-20	Loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30
	20-60	Clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30
2081:												
Zahl-----	0-5	Loam	CL	A-6	0	0-1	95-100	95-100	80-95	55-75	25-40	10-20
	5-20	Loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30
	20-60	Clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30
Williams-----	0-6	Loam	ML, CL	A-4, A-6, A-7	0-2	0-5	95-100	95-100	85-95	60-90	25-45	3-20
	6-10	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	10-15	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	15-24	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	24-36	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	36-60	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
2130:												
Williams-----	0-6	Loam	CL, ML	A-4, A-6, A-7	0-2	0-5	95-100	95-100	85-95	60-90	25-45	3-20
	6-10	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	10-15	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	15-24	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	24-36	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	36-60	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
Zahl-----	0-5	Loam	CL	A-6	0	0-1	95-100	95-100	80-95	55-75	25-40	10-20
	5-20	Loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30
	20-60	Clay loam	CL, CL-ML	A-6, A-7, A-4	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30
Parnell-----	0-15	Silty clay loam	CH, CL, OL	A-7	0	0-1	100	100	95-100	85-100	40-55	20-35
	15-22	Silt loam	CH, CL, OL	A-7	0	0-1	100	100	95-100	85-100	40-55	20-35
	22-32	Silty clay loam	CH, CL	A-7	0	0-2	100	95-100	90-100	70-100	50-75	30-50
	32-55	Silty clay	CH, CL	A-7	0	0-2	100	95-100	90-100	70-100	50-75	30-50
	55-60	Silty clay loam	CH, CL	A-7	0	0-2	95-100	90-100	80-95	70-95	50-60	30-40

ENGINEERING INDEX PROPERTIES--Continued
Williams County, North Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
					>10 inches		3-10 inches		4	10		
			Unified	AASHTO	Pct	Pct						
	In											
2131: Zahl-----	0-5	Loam	CL	A-6	0	0-1	95-100	95-100	80-95	55-75	25-40	10-20
	5-20	Loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30
	20-60	Clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30
	0-6	Loam	CL, ML	A-4, A-6, A-7	0-2	0-5	95-100	95-100	85-95	60-90	25-45	3-20
	6-10	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	10-15	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
Williams-----	15-24	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	24-36	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	36-60	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	0-15	Silty clay loam	CH, CL, OL	A-7	0	0-1	100	100	95-100	85-100	40-55	20-35
	15-22	Silt loam	CH, CL, OL	A-7	0	0-1	100	100	95-100	85-100	40-55	20-35
	22-32	Silty clay loam	CH, CL	A-7	0	0-2	100	95-100	90-100	70-100	50-75	30-50
Parnell-----	32-55	Silty clay	CH, CL	A-7	0	0-2	100	95-100	90-100	70-100	50-75	30-50
	55-60	Silty clay loam	CH, CL	A-7	0	0-2	95-100	90-100	80-95	70-95	50-60	30-40
	0-8	Loam	CL, CL-ML	A-4, A-6	---	0	95-100	95-100	85-95	60-85	25-40	5-20
	8-12	Loam	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	---	0-3	95-100	75-100	55-90	35-80	20-45	5-20
	12-22	Loam	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	---	0-3	95-100	75-100	55-90	35-80	20-45	5-20
	22-26	Gravelly loamy coarse sand	GM, GP-GM, SM, SP-SM	A-1, A-3	---	0-5	25-100	15-100	10-70	5-25	0-30	NP-5
2170: Divide-----	26-60	Very gravelly coarse sand	GM, GP-GM, SM, SP-SM	A-1, A-3	---	0-5	25-100	15-100	10-70	5-25	0-30	NP-5
	0-5	Loam	CL	A-6	0	0-1	95-100	95-100	80-95	55-75	25-40	10-20
	5-20	Loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30
	20-60	Clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30
	0-6	Loam	CL, ML	A-4, A-6, A-7	0-2	0-5	95-100	95-100	85-95	60-90	25-45	3-20
	6-10	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
2176: Zahl-----	10-15	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	15-24	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	24-36	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	36-60	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	0-9	Loamy sand	SM, SP-SM	A-1, A-2	0	0	95-100	95-100	40-65	10-25	0-14	NP
	9-15	Fine sandy loam	GM, GP-GM, SM, SP-SM	A-1, A-2, A-3, A-4	0	0-5	55-100	50-100	40-85	5-55	0-20	NP-5
2261: Schaller-----	15-60	Gravelly loamy coarse sand	GM, GP-GM, SM, SP-SM	A-1, A-2-4, A-3	0	0-5	55-90	50-90	40-70	5-15	0-20	NP-5
	0-2	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-40	5-20
	2-18	Clay loam	CH, CL	A-6, A-7	0	0	100	100	90-100	70-100	35-70	20-40
	18-28	Loam	CH, CL	A-6	0	0	100	100	90-100	60-100	25-55	10-30
	28-38	Very fine sandy loam	CL-ML	A-4	0	0	100	100	85-95	50-65	25-35	10-15
	38-40	clay loam	CL, CL-ML	A-6, A-7	0	0	100	100	90-100	70-80	40-50	20-30
2270: Harriet-----	40-60	Stratified very fine sandy loam to silty clay	CL, CL-ML, CH	A-4, A-6, A-7	0	---	100	100	90-100	60-100	20-65	5-40
	0-7	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0	100	100	60-95	30-60	15-25	NP-5
	7-15	Fine sandy loam	CL, ML, SC, SM	A-2, A-4	0	0	100	100	60-95	30-75	15-30	NP-10
	15-26	Loam	CL, ML, SC, SM	A-2, A-4, A-6	0	0	100	100	50-100	15-90	0-30	NP-15
	26-34	Very fine sandy loam	CL, ML, SC, SM	A-2, A-4, A-6	0	0	100	100	50-100	15-90	0-30	NP-15
	34-44	Silt loam	CL, ML, SC, SM	A-4, A-6, A-2	0	0	100	100	50-100	15-90	0-30	NP-15
2338: Amor-----	44-60	Loamy fine sand	CL, ML, SC, SM	A-2, A-4, A-6	0	0	100	100	50-100	15-90	0-30	NP-15
	0-8	Loam	CL, CL-ML, ML	A-6, A-4	0	0	100	95-100	85-90	60-70	25-40	3-18
	8-19	Loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	90-100	65-85	20-45	5-25
	19-31	Loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	75-100	50-80	20-45	2-25
	31-60	Bedrock			---	---	---	---	---	---	---	---
	0-6	Loam	CL, ML	A-4, A-6, A-7	0-2	0-5	95-100	95-100	85-95	60-90	25-45	3-20
Williams-----	6-10	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	10-15	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	15-24	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	24-36	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	36-60	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30
	0-5	Loam	CL	A-6	0	0-1	95-100	95-100	80-95	55-75	25-40	10-20
Zahl-----	5-20	Loam	CL, CL-ML	A-7, A-4, A-6	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30
	20-60	Clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30

ENGINEERING INDEX PROPERTIES--Continued
Williams County, North Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
					>10 inches		3-10 inches		4	10		
			Unified	AASHTO	Pct	Pct						
	In											
2339:												
Amor-----	0-8	Loam	CL, CL-ML, ML	A-4, A-6	0	0	100	95-100	85-90	60-70	25-40	3-18
	8-19	Loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	90-100	65-85	20-45	5-25
	19-31	Loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	75-100	50-80	20-45	2-25
Zahl-----	31-60	Bedrock			---	---	---	---	---	---	---	---
	0-5	Loam	CL	A-6	0	0-1	95-100	95-100	80-95	55-75	25-40	10-20
	5-20	Loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30
Cabba-----	20-60	Clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30
	0-3	Silt loam	CL, CL-ML, ML	A-4	0	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	3-15	Loam	CL, CL-ML	A-4, A-6	0	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	15-60	Bedrock			---	---	---	---	---	---	---	---
2340:												
Arnegard-----	0-13	Loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-95	60-85	20-35	5-20
	13-36	Loam	CL	A-6	0	0	100	100	85-100	50-85	20-35	12-25
	36-60	Loam	CL, ML, SC, SM	A-4, A-6	0	0	100	100	70-100	40-80	15-40	NP-15
Shambo-----	0-9	Loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	85-95	60-75	25-35	3-13
	9-29	Loam	CL	A-6, A-4	0	0	100	100	85-95	60-75	25-40	3-18
	29-48	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	25-40	3-18
	48-60	Loam	CL	A-4, A-6	0	0	100	100	85-95	60-75	25-40	3-18
2341:												
Brandenburg----	0-4	Channery loam	CL, CL-ML, GC-GM, SC	A-2, A-4, A-6	0	0-5	60-100	40-80	35-75	30-65	20-35	5-15
	4-10	Very channery loam	CL, GM, ML, SM	A-2, A-4, A-6	0	0-5	60-100	40-80	35-75	30-65	0-35	NP-15
	10-60	Fragmental material	GP	A-1	0	80-85	15-25	5-10	0-5	0	0-14	NP
2342:												
Cabba-----	0-3	Loam	CL, CL-ML, ML	A-4	0	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	3-15	Loam	CL, CL-ML	A-4, A-6	0	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	15-60	Bedrock			---	---	---	---	---	---	---	---
Amor-----	0-8	Loam	CL, CL-ML, ML	A-4, A-6	0	0	100	95-100	85-90	60-70	25-40	3-18
	8-19	Loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	90-100	65-85	20-45	5-25
	19-31	Loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	75-100	50-80	20-45	2-25
Zahl-----	31-60	Bedrock			---	---	---	---	---	---	---	---
	0-5	Loam	CL	A-6	0	0-1	95-100	95-100	80-95	55-75	25-40	10-20
	5-20	Loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30
	20-60	Clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30
2343:												
Cherry-----	0-3	Silt loam	CL	A-6, A-4	0	0	100	100	85-100	60-90	25-35	10-20
	3-33	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	80-95	25-45	10-30
	33-60	Silty clay	CH, CL	A-6, A-7	0	0	100	100	90-100	80-95	25-55	10-30
2344:												
Cherry-----	0-3	Silt loam	CL	A-6, A-4	0	0	100	100	85-100	60-90	25-35	10-20
	3-33	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	80-95	25-45	10-30
	33-60	Silty clay	CH, CL	A-6, A-7	0	0	100	100	90-100	80-95	25-55	10-30
2345:												
Daglum-----	0-7	Silt loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	7-8	Silt loam	CL	A-6	0	0	100	100	85-100	60-90	30-40	10-15
	8-18	Clay	CH, CL	A-7-6	0	0	100	100	90-100	70-95	45-70	20-40
Rhoades-----	18-32	Clay loam	CH, CL	A-7-6	0	0	100	100	90-100	70-95	45-70	20-40
	32-60	Clay loam	CL, CH	A-7-6	0	0	100	100	85-100	65-95	45-70	20-40
	0-3	Loam	CL	A-6, A-7-6	0	0	100	100	85-100	60-95	30-45	10-15
	3-8	Silty clay	CH	A-7-6	0	0	100	100	90-100	80-95	50-65	25-35
	8-14	Silty clay	CH	A-7-6	0	0	100	100	90-100	75-95	50-65	25-35
	14-46	Silty clay	CH, CL, ML, MH	A-7-6, A-6	0	0	100	100	90-100	70-95	35-60	10-30
	46-60	Silty clay loam	CH, CL, ML	A-6, A-7-6	0	0	100	100	85-100	75-95	35-60	10-30
2346:												
Dooley-----	0-6	Fine sandy loam	ML, SC-SM, SM	A-4	0	0-5	90-100	80-100	65-90	35-60	20-25	NP-5
	6-15	Sandy clay loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0-5	90-100	80-100	65-95	40-70	25-40	5-15
	15-24	Sandy loam	ML, SC-SM, SM	A-4	0	0-5	90-100	80-100	65-90	35-60	20-25	NP-5
	24-60	Clay loam	CL	A-6, A-7	0-1	0-5	85-100	80-100	70-95	55-80	30-50	10-25
2347:												
Bearden-----	0-7	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	30-35	10-15
	7-18	Silty clay loam	CL	A-4, A-6, A-7	0	0	100	100	90-100	80-95	30-45	10-20
	18-36	Silty clay loam	CL, CL-ML	A-4, A-6, A-7	0	0	100	100	90-100	80-95	30-45	10-20
	36-60	Silty clay loam	CH, CL, CL-ML	A-6, A-7	0	0	100	100	90-100	80-95	30-65	10-40

ENGINEERING INDEX PROPERTIES--Continued
Williams County, North Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index		
					>10 inches		3-10 inches		4	10	40	200		
			Unified	AASHTO	Pct	Pct								
	In													
2348: Channel----- Korchea-----	0-60	Loam	CL, CL-ML	A-4, A-6	---	---	---	---	---	---	---	---	---	---
	0-6	Stratified fine sandy loam to silty clay loam	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0	0	95-100	95-100	70-100	40-95	20-50	20-50	5-15	5-20
Divide-----	6-60													
	0-8	Loam	CL, CL-ML	A-4, A-6	---	0	95-100	95-100	85-95	60-85	25-40	25-40	5-20	5-20
	8-12	Loam	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	---	0-3	95-100	75-100	55-90	35-80	20-45	20-45		
	12-22	Loam	CL, CL-ML, SC, SC-SM	A-6, A-7, A-4	---	0-3	95-100	75-100	55-90	35-80	20-45	20-45	5-20	
	22-26	Gravelly loamy coarse sand	GM, GP-GM, SM, SP-SM	A-1, A-3	---	0-5	25-100	15-100	10-70	5-25	0-30	NP-5		
2349: Lawther-----	26-60	Very gravelly coarse sand	GM, GP-GM, SM, SP-SM	A-1, A-3	---	0-5	25-100	15-100	10-70	5-25	0-30	NP-5		
	0-10	Silty clay	CH, CL	A-7	0	0	100	100	90-100	75-95	45-70	25-40		
	10-33	Silty clay	CH	A-6, A-7	0	0	100	100	90-100	75-95	50-75	30-50		
	33-47	Silty clay	CH, CL	A-6, A-7	0	0	100	100	90-100	75-95	50-75	30-50		
	47-60	Clay loam	CH, CL	A-6, A-7	0	0	100	100	90-100	70-95	40-75	25-50		
2350: Lehr-----	0-6	Loam	CL, CL-ML, ML	A-4, A-6	0	0	95-100	95-100	85-95	60-80	20-40	3-15		
	6-11	Loam	SC, SC-SM, CL, CL-ML	A-4, A-6	0-2	0-5	90-100	80-100	75-95	40-75	25-40	5-15		
	11-15	Loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0-2	0-5	90-100	80-100	75-95	40-75	25-40	5-15		
	15-22	Gravelly loamy coarse sand	SM, SP-SM	A-1	0-2	0-5	65-90	50-75	30-50	5-15	0-14	NP		
	22-60	Very gravelly coarse sand	SP, GM, GP, SM	A-1	0-2	0-5	40-80	25-60	10-35	2-15	0-14	NP		
Williams-----	0-6	Loam	CL, ML	A-4, A-6, A-7	0-2	0-5	95-100	95-100	85-95	60-90	25-45	3-20		
	6-10	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30		
	10-15	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30		
	15-24	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30		
	24-36	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30		
2351: Lehr-----	36-60	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30		
	0-6	Loam	CL, CL-ML, ML	A-4, A-6	0	0	95-100	95-100	85-95	60-80	20-40	3-15		
	6-11	Loam	SC, SC-SM, CL, CL-ML	A-4, A-6	0-2	0-5	90-100	80-100	75-95	40-75	25-40	5-15		
	11-15	Loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0-2	0-5	90-100	80-100	75-95	40-75	25-40	5-15		
	15-22	Gravelly loamy coarse sand	SM, SP-SM	A-1	0-2	0-5	65-90	50-75	30-50	5-15	0-14	NP		
Williams-----	22-60	Very gravelly coarse sand	GM, GP, SM, SP	A-1	0-2	0-5	40-80	25-60	10-35	2-15	0-14	NP		
	0-6	Loam	ML, CL	A-6, A-7, A-4	0-2	0-5	95-100	95-100	85-95	60-90	25-45	3-20		
	6-10	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30		
	10-15	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30		
	15-24	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30		
2352: Blanchard----- Lihen-----	24-36	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30		
	36-60	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30		
	0-9	Loamy fine sand	SM	A-2	0	0	100	100	50-75	15-30	0-14	NP		
	9-24	Loamy fine sand	SM	A-2	0	0	100	100	60-85	15-35	0-14	NP		
	24-32	Sand	SM	A-2	0	0	100	100	50-90	15-35	0-20	NP-5		
2353: Livona-----	32-60	Sand	SM	A-2	0	0	100	100	50-90	15-35	0-20	NP-5		
	0-8	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0-2	0-5	95-100	90-100	50-70	30-55	0-25	NP-5		
	8-15	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0-2	0-5	95-100	90-100	50-70	30-55	0-25	NP-5		
	15-19	Sandy clay loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0-2	0-5	95-100	90-100	80-95	35-60	20-40	5-25		
	19-24	Clay loam	CL, SC	A-6, A-7	0-2	0-5	95-100	90-100	80-95	45-75	25-50	10-30		
2354: Livona----- Zahl-----	24-52	Clay loam	CL, SC	A-6, A-7	0-2	0-5	95-100	90-100	80-95	45-75	25-50	10-30		
	52-60	Loam	CL	A-6, A-7	0-2	0-5	95-100	90-100	80-95	60-80	30-50	10-30		
	0-8	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0-2	0-5	95-100	90-100	50-70	30-55	0-25	NP-5		
	8-15	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0-2	0-5	95-100	90-100	50-70	30-55	0-25	NP-5		
	15-19	Sandy clay loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0-2	0-5	95-100	90-100	80-95	35-60	20-40	5-25		
Zahl-----	19-24	Clay loam	CL, SC	A-6, A-7	0-2	0-5	95-100	90-100	80-95	45-75	25-50	10-30		
	24-52	Clay loam	CL, SC	A-6, A-7	0-2	0-5	95-100	90-100	80-95	45-75	25-50	10-30		
	52-60	Loam	CL	A-6, A-7	0-2	0-5	95-100	90-100	80-95	60-80	30-50	10-30		
	0-5	Loam	CL	A-6	0	0-1	95-100	95-100	80-95	55-75	25-40	10-20		
	5-20	Loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30		
20-60	Clay loam	CL, CL-ML	A-6, A-7, A-4	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30			

ENGINEERING INDEX PROPERTIES--Continued
Williams County, North Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index	
					>10 inches		3-10 inches		4	10			
			Unified	AASHTO	Pct	Pct							
	In												
2355: Mondamin-----	0-6	Silty clay loam	CH, CL, MH, CL-ML	A-6, A-7	0	0	100	100	95-100	80-95	35-55	10-30	
	6-13	Silty clay	CH	A-7	0	0	100	100	95-100	80-100	50-70	25-40	
	13-21	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	90-100	40-60	15-35	
	21-35	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	90-100	40-60	15-35	
	35-43	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	90-100	40-60	15-35	
	43-55	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	90-100	40-70	25-40	
2356: Niobell-----	55-60	Silty clay	CH, CL	A-7	0	0	100	100	95-100	90-100	40-70	25-40	
	0-6	Loam	CL, CL-ML, ML	A-4, A-6	0	0	95-100	95-100	85-95	60-75	25-38	3-15	
	6-9	Loam	ML, CL, CL-ML	A-4, A-6	0	0	95-100	95-100	85-95	60-75	25-38	3-15	
	9-19	Clay loam	CH, CL	A-6, A-7	0	0-1	95-100	95-100	90-100	70-80	30-60	15-35	
	19-29	Clay loam	CL, CH	A-7	0	0-1	95-100	90-100	85-100	65-85	40-60	15-30	
	29-60	Loam	CL, CL-ML, ML	A-4, A-6	0	0-1	95-100	95-100	85-95	60-75	25-40	3-18	
Williams-----	0-6	Loam	CL, ML	A-4, A-6, A-7	0-2	0-5	95-100	95-100	85-95	60-90	25-45	3-20	
	6-10	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30	
	10-15	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30	
	15-24	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30	
	24-36	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30	
	36-60	Clay loam	CL	A-6, A-7	0-2	0-5	95-100	95-100	80-100	60-80	30-50	10-30	
2357: Savage-----	0-7	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	30-45	15-30	
	7-25	Silty clay	CH, CL	A-7	0	0	100	100	95-100	85-95	40-70	20-45	
	25-51	Silty clay	CH, CL	A-7	0	0	100	100	95-100	85-95	40-70	20-45	
	51-60	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	85-95	40-70	20-45	
	Grail-----	0-10	Silty clay loam	CL	A-6, A-7	0	0	100	95-100	95-100	85-95	30-50	10-30
	10-24	Silty clay	CH, CL, MH	A-6, A-7	0	0	100	95-100	95-100	70-95	35-60	10-35	
2358: Tally-----	24-52	Silty clay loam	MH, CL, CH	A-6, A-7	0	0	100	95-100	90-100	65-95	30-55	10-35	
	52-60	Silty clay loam	CL, CH	A-6, A-7	0	0	100	95-100	85-100	60-95	30-55	10-35	
	0-6	Fine sandy loam	CL, ML, SC, SM, CL-ML	A-2, A-4	0	0	90-100	80-100	55-100	25-55	15-30	NP-10	
	6-32	Fine sandy loam	ML, SC, SC-SM, SM, CL-ML	A-2, A-4	0	0	90-100	80-100	60-100	25-50	15-25	NP-10	
	32-60	Fine sandy loam	SC-SM, SC, SM, CL-ML, ML	A-2, A-4	0	0	90-100	80-100	60-100	15-50	15-25	NP-10	
2359: Vebar-----	0-5	Fine sandy loam	ML, SM	A-2, A-4	---	3-25	95-100	90-100	60-100	30-55	0-14	NP	
	5-26	Fine sandy loam	ML, SM	A-2, A-4	0	0	95-100	90-100	60-100	30-55	0-14	NP	
	26-32	Fine sandy loam	SM, ML	A-4, A-2	0	0	95-100	90-100	60-100	30-55	0-14	NP	
	32-60	Bedrock			---	---	---	---	---	---	---	---	
	Flasher-----	0-6	Loamy fine sand	SM	A-2	0	0-5	85-100	85-100	50-100	15-35	10-20	NP
	6-10	Loamy fine sand	SM	A-2	0	0-5	85-100	85-100	50-100	15-35	10-20	NP	
2360: Zahl-----	10-60	Bedrock			---	---	---	---	---	---	---	---	
	0-5	Loam	CL	A-6	0	0-1	95-100	95-100	80-95	55-75	25-40	10-20	
	5-20	Loam	CL, CL-ML	A-7, A-4, A-6	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30	
	20-60	Clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-1	90-100	85-100	80-95	55-80	25-50	5-30	
	Vebar-----	0-5	Fine sandy loam	ML, SM	A-2, A-4	---	3-25	95-100	90-100	60-100	30-55	0-14	NP
	5-26	Fine sandy loam	ML, SM	A-2, A-4	0	0	95-100	90-100	60-100	30-55	0-14	NP	
2360: Flasher-----	26-32	Fine sandy loam	SM, ML	A-4, A-2	0	0	95-100	90-100	60-100	30-55	0-14	NP	
	32-60	Bedrock			---	---	---	---	---	---	---	---	
	0-6	Loamy fine sand	SM	A-2	0	0-5	85-100	85-100	50-100	15-35	10-20	NP	
	6-10	Loamy fine sand	SM	A-2	0	0-5	85-100	85-100	50-100	15-35	10-20	NP	
	10-60	Bedrock			---	---	---	---	---	---	---	---	
	Tally-----	0-6	Fine sandy loam	CL, ML, SC, SM, CL-ML	A-2, A-4	0	0	90-100	80-100	55-100	25-55	15-30	NP-10
2361: Wabek-----	6-32	Fine sandy loam	SC, SC-SM, SM, CL-ML, ML	A-2, A-4	0	0	90-100	80-100	60-100	15-50	15-25	NP-10	
	32-60	Fine sandy loam	SC, SC-SM, SM, CL-ML, ML	A-2, A-4	0	0	90-100	80-100	60-100	15-50	15-25	NP-10	
	0-5	Sandy loam	SM	A-2, A-4	0	0-1	85-100	85-100	60-70	30-40	0-14	NP	
	5-9	Gravelly coarse	GM, SM	A-1-b, A-2, A-4	0	0-1	50-80	50-80	30-60	20-40	0-14	NP	
	9-60	Very gravelly sandy loam	GM, SM, SP, SW	A-1	0	0-1	25-90	10-65	5-35	0-25	0-14	NP	
	Wabek-----	0-5	Sandy loam	SM	A-2, A-4	0	0-1	85-100	85-100	60-70	30-40	0-14	NP
2362: Wabek-----	5-9	Gravelly coarse	GM, SM	A-1-b, A-2, A-4	0	0-1	50-80	50-80	30-60	20-40	0-14	NP	
	9-60	Very gravelly sandy loam	GM, SM, SP, SW	A-1	0	0-1	25-90	10-65	5-35	0-25	0-14	NP	
		Very gravelly coarse sand											

ENGINEERING INDEX PROPERTIES--Continued
Williams County, North Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
					Pct	Pct	—	—	—	—		
In	—	—	—	—	—	—	—	—	—	—	Pct	—
2363: Wildrose-----	0-6	Silty clay	CH	A-7	0	0	100	100	95-100	80-100	50-70	25-40
	6-14	Clay	CH	A-7	0	0	100	100	95-100	80-100	50-70	25-40
	14-21	Clay	CH	A-7	0	0	100	100	95-100	85-100	50-70	25-40
	21-31	Clay	CH	A-7	0	0	100	100	95-100	85-100	50-70	25-40
	31-38	Clay	CH	A-7	0	0	100	100	95-100	85-100	50-70	25-40
	38-44	Clay	CH	A-7	0	0	100	100	95-100	85-100	50-70	25-40
	44-58	Clay	CH	A-7	0	0	100	100	95-100	85-100	50-70	25-40
	58-60	Silty clay	CH	A-7	0	0	100	100	95-100	85-100	50-70	25-40
2364: McKeen-----	0-2	Loam	CL	A-6	0	0	100	100	85-100	60-95	25-35	10-15
	2-12	Loam	CL	A-6	0	0	100	100	85-100	60-95	25-35	10-15
	12-15	Silty clay	CH, CL	A-6, A-7-6, A-5	0	0	100	100	90-100	70-100	30-60	10-35
	15-60	Stratified loamy fine sand to silty clay	CH, CL, ML	A-7-6, A-6, A-4	0	0	100	100	60-100	25-100	15-60	1-30
2365: Lohler, Moderately Saline-----	0-8	Silty clay	CH, CL	A-7	0	0	100	100	95-100	80-95	45-70	25-50
	8-60	Stratified silty clay loam to clay	CH, CL	A-7	0	0	100	100	95-100	80-95	45-70	25-50
2366: Scorio-----	0-8	Silty clay	CH, CL	A-7	0	0	100	100	95-100	80-95	45-70	25-50
	8-32	Silty clay	CH, CL	A-6, A-7	0	0	100	100	90-100	80-95	45-70	25-50
	32-60	Stratified loam to very fine sand	ML, SM	A-2, A-4	0	0	100	100	75-95	30-75	0-25	NP-10
2367: Scorio, Saline-	0-8	Silty clay	CH, CL	A-7	0	0	100	100	95-100	80-95	45-70	25-50
	8-32	Silty clay	CH, CL	A-6, A-7	0	0	100	100	90-100	80-95	45-70	25-50
	32-60	Stratified loam to very fine sand	ML, SM	A-2, A-4	0	0	100	100	75-95	30-75	0-25	NP-10

